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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/752,520	01/03/2001	Michio Masuda	Q62568	9986

7590 04/23/2004

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EXAMINER	
MAURO JR, THOMAS J	
ART UNIT	**PAPER NUMBER**
2143	7

DATE MAILED: 04/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/752,520	MASUDA ET AL.	
	Examiner	Art Unit	
	Thomas J. Mauro Jr.	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2,4,5,6*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-21 are pending and are presented for examination. A formal action on the merits of claims 1-21 follows.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2 and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Terrell et al. (US 2002/0188720).

With respect to claim 1, Terrell teaches an input interface connected to input communication lines **[Terrell -- Figure 1, Page 2 paragraph [0023] lines 4-9 (of paragraph), page 2 paragraph [0031] lines 1-4 and page 5 paragraph [0042] – Clients are connected to edge device and core device, i.e. router/switch through an input interface using I/O drivers]**;

a switch circuit **[Terrell -- Page 3 paragraph [0028] – Core device is a network switching center]**; and

an output interface connected to output communication lines **[Terrell -- Figure 1, and page 2 paragraph [0031] lines 1-4 – Core device outputs packets through an output interface using I/O drivers]**,

wherein said input interface comprises an allocating section which determines a class identifier indicative of one of the classes to which an IP packet belongs, from header data of said IP packet received through one of said input communication lines **[Terrell -- Figures 4, 5, page 4 paragraph [0034] lines 1-5, paragraph [0035] lines 8-13, and paragraphs [0036] and [0041] – Incoming data packet's header is analyzed against filter criteria to determine if a service class has been contracted or allocated for the particular source IP and destination IP found in the header]**, and allocates an IP-QOS code to said IP packet **[Terrell -- Figures 4, 5, page 4 paragraph [0035] lines 8-13 and paragraph [0036] and page 5 paragraphs [0044-0045] – Classifier marks, i.e. allocates, a type of service (TOS) code in the packet to indicate the subscribed service level, i.e. best effort (BE) or expedited forwarding (EF)]**, and

wherein said switch circuit selects one of said output communication lines based on a destination address of said IP packet, such that said IP packet is outputted from said output interface to said selected output communication output interface **[Terrell -- Page 5 paragraph [0045] lines 21-24 – Data packet is routed in accordance with the subscribed service level to the appropriate destination which is inherently determined from the header's destination IP field]**.

With respect to claim 2, Terrell further teaches wherein said allocating section specifies traffic priority based on IP header and/or TCP header **[Terrell -- Figure 4 and page 4**

paragraph [0036] – TOS field in IP header, marked, i.e. allocated, by classifier, determines by which service level data will be routed. If TOS bit is set to '0', normal "best effort" (BE) routing is used. However, if TOS bit is set to '1', higher priority and faster "expedited forwarding" (EF) routing is used].

With respect to claim 11, Terrell teaches a method of controlling a transmission of packet flow, comprising:

determining a class identifier indicative of one of the classes to which an IP packet belongs, from header data of said IP packet **[Terrell -- Figures 4, 5, page 4 paragraph [0034] lines 1-5, paragraph [0035] lines 8-13, and paragraphs [0036] and [0041] – Incoming data packet's header is analyzed against filter criteria to determine if a service class has been contracted or allocated for the particular source IP and destination IP found in the header]** received through one of the input communication lines **[Terrell -- Figure 1, Page 2 paragraph [0023] lines 4-9 (of paragraph), page 2 paragraph [0031] lines 1-4 and page 5 paragraph [0042] – Clients are connected to edge device and core device, i.e. router/switch through an input interface using I/O drivers]**;

allocating an IP-QoS (Internet Protocol Quality-of-Service) code to said IP packet **[Terrell -- Figures 4, 5, page 4 paragraph [0035] lines 8-13 and paragraph [0036] and page 5 paragraphs [0044-0045] – Classifier marks, i.e. allocates, a type of service (TOS) code in the packet to indicate the subscribed service level, i.e. best effort (BE) or expedited forwarding (EF)]**; and

selecting one of the output communication lines based on a destination address of said IP packet **[Terrell -- Page 5 paragraph [0045] lines 21-24 – Data packet is routed in accordance with the subscribed service level to the appropriate destination which is inherently determined from the header's destination IP field]**, such that said IP packet is outputted from said output interface to said selected output communication output interface **[Terrell -- Figure 1, and page 2 paragraph [0031] lines 1-4 – Core device outputs packets through an output interface using I/O drivers]**.

With respect to claim 12, this is a method claim corresponding to the apparatus claimed in claim 2. It has similar limitations; therefore, claim 12 is rejected under the same rationale.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3-5 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terrell et al. (US 2002/0188720), as applied to claims 1 and 11 above respectively, in view of Hoffman et al. (U.S. 6,094,435).

Regarding claim 3, Terrell teaches the invention substantially as claimed, as aforementioned in claim 1 above, including a scheduler which controls said switch circuit for scheduling IP packets **[Terrell -- Figure 2 and page 4 paragraph [0038] lines 7-13 – Scheduler schedules transmission of data packets through switching center, i.e. core device, in accordance with the subscribed service level]** and wherein said scheduler carries out a fixed priority scheduling method for said IP packets based on said class identifier **[Terrell -- Figures 4, 5, page 4 paragraph [0036], page 5 paragraph [0044] lines 13-19 and paragraph [0045] lines 19-24 – Scheduler uses fixed priority scheduling to data packets based upon the TOS/service level field, i.e. class identifier. Packets marked with EF, for example, will always have priority over packets marked with BE]**.

Terrell fails to teach wherein said scheduler uses weighted round robin scheduling (WRR). Hoffman, however, discloses a multi-layer network element for forwarding received packets from an input port to an output port using Quality of Service (QoS) employing a weighted round robin scheduling system on multiple queues **[Hoffman -- Abstract and Col. 20 lines 46-58]**. Both Terrell and Hoffman are concerned with routing data packets using QoS and differentiated service provisions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the weighted round robin scheduling, as taught by Hoffman into the system of Terrell, in order to provide another well known and widely used scheduling method to use which provides for fair and equal transmission of packets from multiple queues.

Regarding claim 4, Terrell-Hoffman teach the invention substantially as claimed, as aforementioned in claim 3 above, including wherein said scheduler controls said switch circuit based on said IP-QOS, i.e. TOS, code **[Terrell -- Figures 4, 5, page 4 paragraph [0036], page 5 paragraph [0044] lines 13-19 and paragraph [0045] lines 19-24 – Scheduler schedules data packets in network switching center based upon the TOS/service level field, i.e. IP-QOS, bit. Packets marked with EF (denoted by a '1' in the TOS field), for example, will always have priority over packets marked with BE (denoted by a '0' in the TOS field)]**.

Regarding claim 5, Terrell-Hoffman teach the invention substantially as claimed, further comprising a queue managing section which manages a queue such that a plurality of packets can be shared in units of said IP-QoS, i.e. TOS, codes **[Hoffman -- Col. 19 lines 20-50 – Packets with the same priority, i.e. TOS code are grouped together in the same queue]**.

Regarding claims 13-15, these are method claims corresponding to the apparatus claimed in claims 3-5. They have similar limitations; therefore, claims 13-15 are rejected under the same rationale.

6. Claims 6, 8, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terrell et al. (US 2002/0188720), as applied to claims 1 and 11 above respectively, in view of Chen et al. (U.S. 6,487,170).

Regarding claim 6, Terrell teaches the invention substantially as claimed, as aforementioned in claim 1 above, including classifying traffic based upon IP-QoS, i.e. TOS, codes **[Terrell -- Figures 4, 5, page 4 paragraph [0035] lines 8-13 and paragraph [0036] and page 5 paragraphs [0044-0045] – Classifier marks, i.e. allocates, a type of service (TOS) code in the packet to indicate the subscribed service level, i.e. best effort (BE) or expedited forwarding (EF)]**.

Terrell fails to explicitly teach monitoring of traffic to restrict excessive traffic.

Chen, however, discloses a system for making decisions in a QoS network with a distributed broker which monitors traffic based upon bandwidth and will pass packets as long as bandwidth is available, otherwise, packets will be dropped **[Chen -- Col. 10 lines 16-20 and lines 42-46]**.

Both Terrell and Chen are concerned with routing packets over a QoS network based upon available bandwidth.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the traffic monitoring functionality, as taught by Chen into the system of Terrell, in order to provide an intelligent mechanism for policy control in a Differentiated Service network.

Regarding claim 8, Terrell-Chen teach the invention substantially as claimed, a packet receiving section to extract header data of said IP packet **[Terrell -- Page 4 paragraph [0035] and [0036] – Classifier must extract header data of the packet in order to determine/mark TOS bit(s)]**;

a class identifier memory **[Terrell -- Pages 5-6, paragraph [0049] – Admission profile database, i.e. class identifier memory, contains listing of profiles for various service levels based upon time of day and source/destination]**;

an IP-QoS class determining section which refers to said class identifier memory to determine class identifier using header data of packet as a search key, i.e. index **[Terrell -- Figures 4, 5, page 4 paragraph [0035] lines 8-13 and paragraph [0036] and page 5 paragraphs [0044-0045] and [0049] – Classifier marks, i.e. allocates, a type of service (TOS) code in the packet to indicate the subscribed service level, i.e. best effort (BE) or expedited forwarding (EF) based upon the admission profile stored in the database, i.e. memory, indexed by the source/destination IP in header]**;

a reception side control section which carries out priority control to said packet that a destination has been specified, based upon IP-QoS, i.e. TOS, code and packet data **[Terrell -- Figure 4 and page 4 paragraph [0036] – TOS field in IP header, marked, i.e. allocated, by classifier, determines by which service level data will be routed. If TOS bit is set to '0', normal "best effort" (BE) routing is used. However, if TOS bit is set to '1', higher priority and faster "expedited forwarding" (EF) routing is used]**; and

a reception side switch interface which carries out said priority control and issues a transmission request to said output interface based upon class identifier **[Terrell -- Figures 4, 5,**

page 4 paragraph [0036], page 5 paragraph [0044] lines 13-19 and paragraph [0045] lines 19-24 – Scheduler schedules data packets in network switching center for transmission based upon the TOS/service level field, i.e. IP-QOS, bit. Packets marked with EF (denoted by a '1' in the TOS field), for example, will always have priority over packets marked with BE (denoted by a '0' in the TOS field)], and

wherein said IP-QoS, i.e. TOS, class determining section monitors traffic which exceeds a transmission permissive capacity and carries out a discarding operation of packets when said traffic exceeds said permissible transmission **[Chen -- Col. 10 lines 16-20 and lines 42-46 – Traffic is monitored and evaluated against available bandwidth, upon which is satisfied, forwarding continues, otherwise, packets are dropped]**.

Regarding claims 16 and 18, these are method claims corresponding to the apparatus claimed in claims 6 and 8. They have similar limitations; therefore, claims 16 and 18 are rejected under the same rationale.

Regarding 19, Terrell-Chen teach the invention substantially as claimed, further comprising:

monitoring a coming traffic which exceeds a transmission permissive capacity which is set for every IP-QoS, i.e. TOS, class **[Chen -- Col. 10 lines 16-20 – Traffic is monitored and evaluated against available bandwidth for a particular service level]**; and

carrying out a discarding operation of IP packets of said coming traffic when said coming traffic exceeds said transmission permissive **[Chen -- Col. 10 lines 42-46 – Packets are dropped, i.e. discarded, if bandwidth levels for a service level are exceeded]**.

7. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terrell et al. (US 2002/0188720), as applied to claims 1 and 11 above respectively, in view of McCloghrie et al. (U.S. 6,286,052).

Regarding claim 7, Terrell teaches the invention substantially as claimed, as aforementioned in claim 1, including wherein said class identifier, i.e. TOS codes, includes "EF" (Expedited Forwarding) and "BE" (Best Effort) **[Terrell -- Page 4 paragraph [0036] – Best effort and expedited forwarding levels of service are implemented]**.

Terrell fails to teach the "AF" (Assured Forwarding) service.

McCloghrie, however, teaches a system for identifying data traffic flows applying to QoS networks which discloses that assured forwarding "AF" is a type of per-hop forwarding behavior **[McCloghrie -- Col. 3 lines 23-24]**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the "AF" (assured forwarding) service, as taught by McCloghrie into the system of Terrell, in order to provide another value-added forwarding service to further classify packets for more efficient routing of data packets.

Regarding claim 17, this is a method claim corresponding to the apparatus claimed in claim 7. It has similar limitations; therefore, claim 17 is rejected under the same rationale.

8. Claims 9-10 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terrell et al. (US 2002/0188720), as applied to claims 1 and 11 above respectively, in view of Chen et al. (U.S. 6,487,170) and Hoffman et al. (U.S. 6,094,435).

Regarding claim 9, Terrell teaches the invention substantially as claimed, an IP-QoS, i.e. TOS, class scheduler which carries out scheduling functions and operations based on TOS codes to issue a transmission request with a priority **[Terrell -- Page 4 paragraphs [0035-0036], paragraph [0038] lines 7-13 – Scheduler schedules transmissions of data packets in accordance with their subscribed service level, found in the TOS field of the packet header]**; and

a transmission side control which controls said transmission section based on priority **[Terrell -- Figure 4 and page 4 paragraph [0036] and [0038] – TOS field in IP header, marked, i.e. allocated, by classifier, determines by which service level data will be scheduled for transmission and later routed. If TOS bit is set to '0', normal "best effort" (BE) routing is used. However, if TOS bit is set to '1', higher priority and faster "expedited forwarding" (EF) routing is used]**.

Terrell fails to teach a payload memory for storing the received IP packet, a FIFO memory for

storing generated IP packet data and a transmitting section which transmits the packet to a data link layer (layer 2) and a network access layer (layer 3).

Hoffman, however, discloses a packet buffer, i.e. payload, memory upon which the packet data is stored after being received **[Hoffman -- Col. 9 lines 62-67 – Col. 10 lines 1-20]**. Furthermore, Hoffman discloses employing both layer 2 and layer 3 logic for transmitting the data packet to a data link layer (layer 2) and a network access layer (layer 3) **[Hoffman -- Figure 4, Col. 8 lines 56-58 and Col. 14 lines 4-8]**.

In addition, Chen discloses a FIFO memory, i.e. a queue, for storing generated IP packet data awaiting transmission **[Chen -- Col. 6 lines 19-30]**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the packet buffer memory for storing received packets along with the layer 2 and layer 3 switching functionality, as taught by Hoffman, along with the FIFO, i.e. queue, memory for storing packet data awaiting transmission, as taught by Chen into the invention of Terrell, in order to quickly and efficiently forward packets both within a sub network and to other networks with increased functionality and speed along with intelligent scheduling using multiple queues to store packets awaiting routing using proper priority.

Regarding claim 10, Terrell-Hoffman-Chen teach the invention substantially as claimed, as aforementioned in claim 9 above, wherein WRR (weighted round robin) scheduling is used **[Hoffman -- Col. 20 lines 46-58 – WRR scheduling is used to pull packets from the queues for transmission]**.

Regarding claims 20-21, these are method claims corresponding to the apparatus claimed in claims 9 and 10. They have similar limitations; therefore, claims 20-21 are rejected under the same rationale.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Aukia et al. (U.S. 6,594,268) discloses a routing method based on QoS provisioning parameters and network topology.

- Koodli (U.S. 6,633,575) discloses a method for queuing packets in a differentiated services, multiple-priority network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas J. Mauro Jr. whose telephone number is 703-605-1234. The examiner can normally be reached on M-F 8:00a.m. - 4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Wiley can be reached on 703-308-5221. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJM
April 14, 2004

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